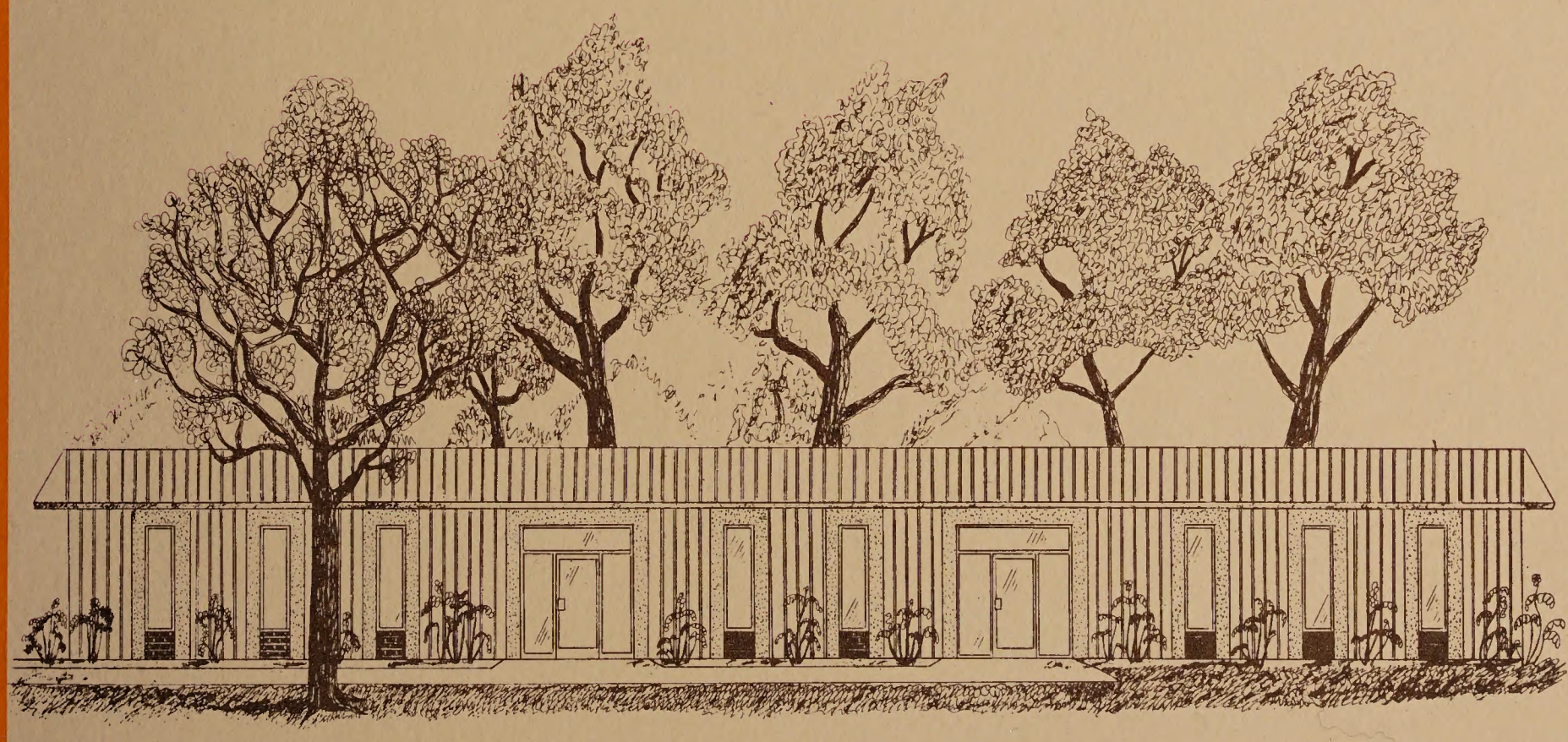
Land Use Plan
Knightdale, North Carolina



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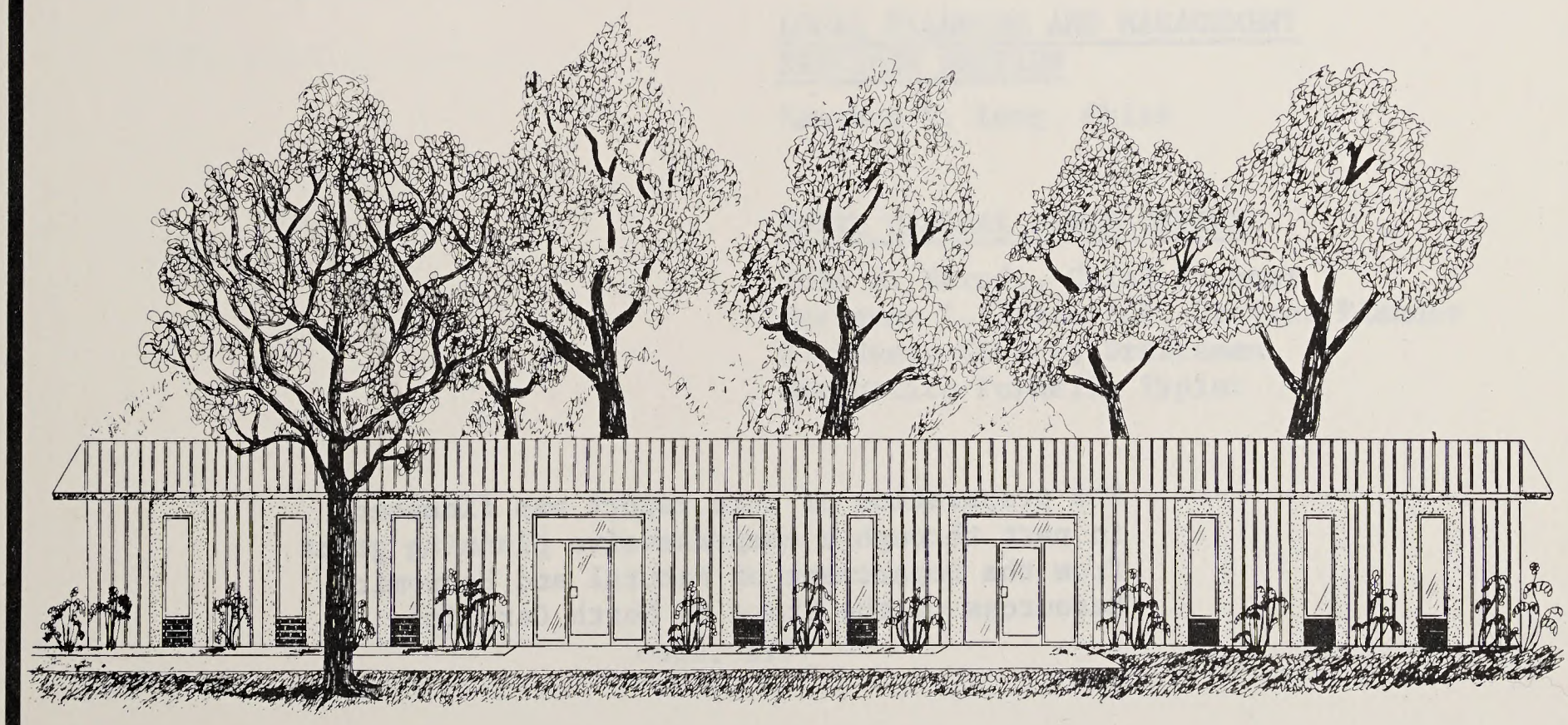

The preparation of this report was financed in part through a comprehensive planning grant from the Department of Natural and Economic Resources of the State of North Carolina.

PREPARED FOR ..... THE TOWN OF KNIGHTDALE,
NORTH CAROLINA

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NORTH CENTRAL FIELD OFFICE

John A. Berndt, Chief Planner
Marianne L. Frederick, Project Planner
J. Edward Kivett, Draftsman
Marguerite Purnell, Typist

June, 1977

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INTRODUCTION

The Town of Knightdale was founded by H. H. Knight and incorporated in 1927. Situated near Raleigh, in the eastern portion of Wake County, the town has many residents who work in Raleigh and has also served as a home for owners of farms in the surrounding area.

Although the town has not experienced the rate of growth in recent decades which has taken place in some of the other Wake County towns, in 1976 a number of factors came together which caused the town to desire to reassess its current planning tools. Among these were the Raleigh water line, the 201 sewerage study and its implications, the improvements to US 64 bypass, and the increases in proposed development in the Knightdale area. Such planning efforts are particularly important because, although the town is small, it has a large, primarily undeveloped extraterritorial planning and zoning jurisdiction, and expectations in this portion of the county are for the Knightdale area to develop more rapidly in the years ahead.

Therefore, in the spring of 1976, the town began contracting with the North Carolina Department of Natural and Economic Resources, Local Planning and Management Services Section, for technical assistance. A contract funded completely with town funds provided for planning board workshops and an updated zoning map (adopted early in 1977). A second contract, funded 40% by the town and 60% with a grant from the Department of Natural and Economic Resources, was for assistance in preparing subdivision regulations (adopted by the town on June 6, 1977) and for this report.

The planning area shown on the maps in this study covers the entire area within one mile of Knightdale's current town limits. The northern portion of this area is not within Knightdale's current planning and zoning jurisdiction, which was established before the annexation north of US 64. The statistics in this report cover only the town's current extraterritorial jurisdiction, but the larger area has been shown on the maps in case the town would want to extend its extraterritorial boundaries at a later date.

Soils

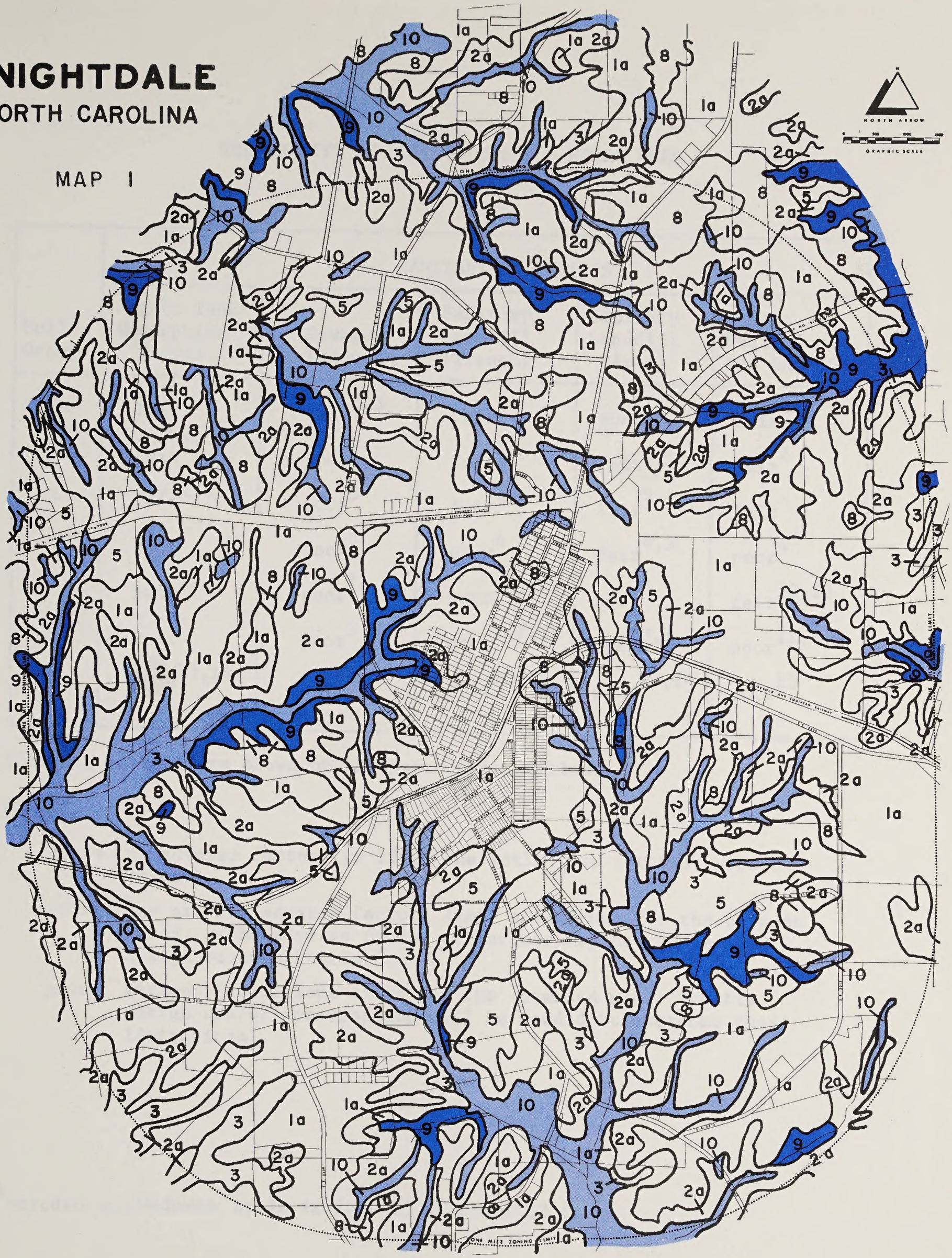
According to the Wake County General Soil Map, the planning area is in the Appling Soil Association. "A soil association", as described in the Wake County Soil Survey, "is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils". Map 1 groups soils in the planning area according to the urban suitability groups in use by the Wake County Planning Department. Group 1a soils are the most suitable for urban development and group 10 soils are the least suitable. Group 3 and 8 soils have rock close to the surface, a characteristic which may add to construction costs. Group 5 soils tend to be plastic and are not well drained - therefore, soils in this group are poor for septic tanks and building foundations. Group 9 soils are steep, while group 10 consists of floodplain soils which are wet most of the year.

Table 1 shows the ratings of the soil groups in the planning area for various types of urban uses. As can be seen from Map 1 and Table 1, most of the soils in the planning area are fair to good for urban uses. However, the soils in groups 9 and 10 should not be developed for urban purposes.

Although not shown on table 1, most soils in the Knightdale area are fair or good for most recreational purposes, except that those having rock close to surface are poor for intensive play areas.

KNIGHTDALE
NORTH CAROLINA

MAP I



URBAN SUITABILITY SOIL GROUPS

1a thru 10

Most suitable to least suitable for development.

9 – Steep

10 – Alluvial Soils

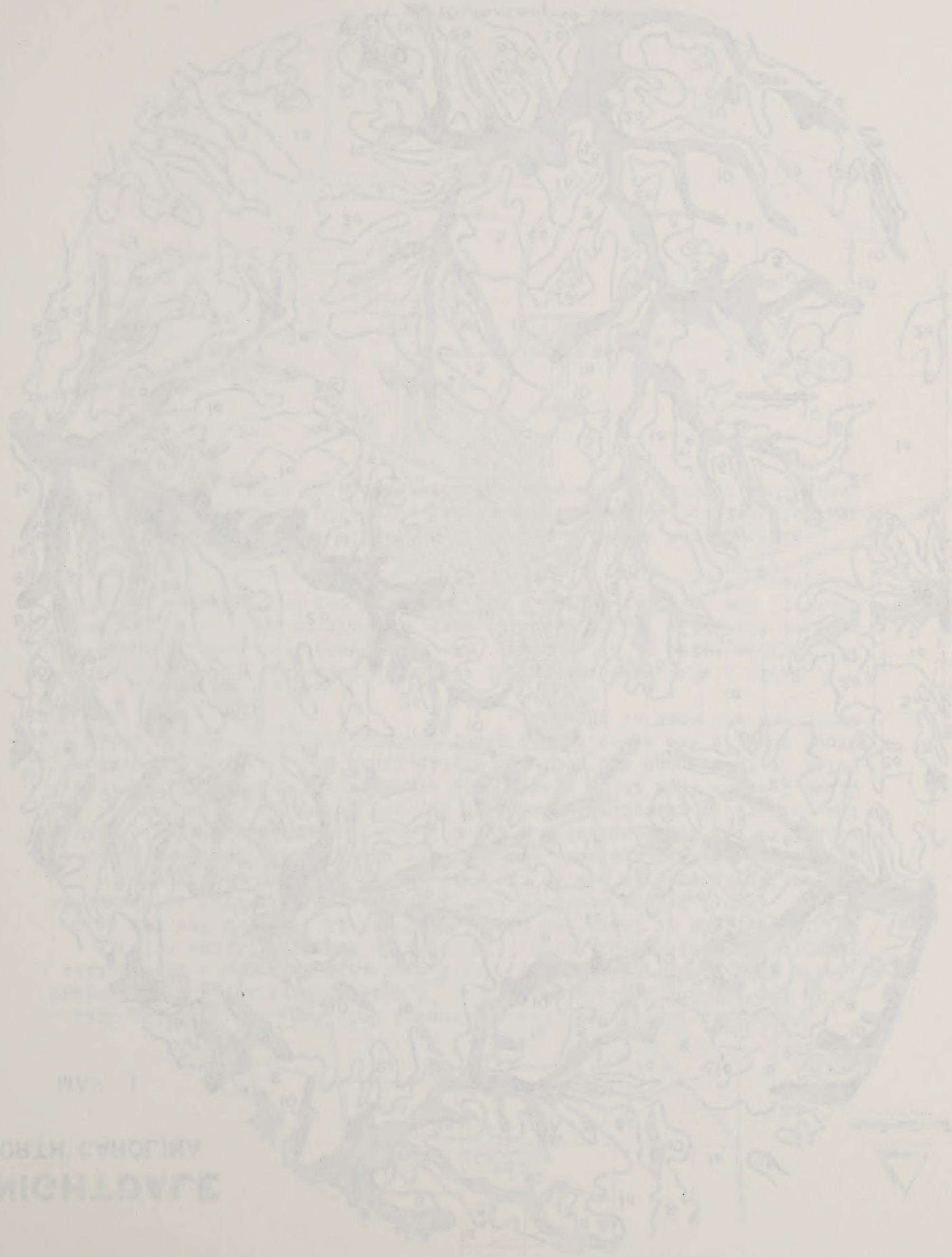


TABLE 1
SUITABILITY OF SOIL GROUPS FOR URBAN USES

Soil Group	SANITARY FACILITIES				
	Septic Tank Absorption Fields	Sewage Lagoons	Sanitary Landfill (Trench)	Sanitary Landfill (Area)	Daily Cover for Landfill
1a	fair[1]	fair[2,3]	fair[4*]	good	fair[4]
2a	fair[1]	poor[3]	fair[4]	fair[3]	fair[4]
3	fair[1,3]	poor[3]	fair[4]	fair[3]	fair[4]
5	poor[1]	poor[3]	poor[4]	fair[4,3]	poor[4]
8	poor[11]	poor[11,3]	poor[11,2]	poor[2]	fair[12,22]
9	poor[3]	poor[3]	poor[3,7,11]	poor[3,7]	poor[12,3]
10	poor[13,14]	poor[13]	poor[13,14]	poor[13,14]	poor[13]

Limiting factors are shown on the pages which follow.

RATINGS

good: no adverse factors to limit the soils' use for the purpose rated.

fair: one or more adverse factors limit soils' use for the purpose rated. (The adverse factor or factors may be removed by design or construction).

poor: serious limitations exist for the intended use. (Costly design and/or construction will be needed to overcome these limitations).

*Mayodan and Wedowee soils include 11 at about 12 feet.

Table 1 contd.

Soil Group	COMMUNITY DEVELOPMENT				
	Shallow Excavations	Dwellings Without Basements	Dwellings With Basements	Small Commercial Buildings	Local Roads and Streets
1a	good[4]	good	good	good	fair[5]
2a	fair[4]	good	good	fair[3]	fair[5]
3	fair[4,3]	fair[3]	fair[3]	poor[3]	fair[5,3]
5	poor[4]	poor[23]	poor[23]	poor[23,3]	poor[23]
8	poor[11]	fair[11]	poor[11]	poor[11]	fair[11]
9	poor[3,11]	poor[3]	poor[3,11]	poor[3,11]	poor[3,11]
10	fair[13]	poor[14]	poor[13,14]	poor[13,14]	poor[14,24]

Table 1 contd.

Soil Group	WATER MANAGEMENT						
	Pond Reservoir Levels	Embankment Ditches and Levels	Excavated Pond (Aquifer Fed)	Drainage	Irrigation	Terraces and Diversions	Grassed Waterways
1a	fair[2]	poor[6,5,7]	poor[8]	9	fair[10,7]	good	good
2a	fair[2]	poor[6,5,7]	poor[8]	9	fair[10,7]	fair[10]	fair[7,3]
3	fair[2]	poor[6,5,7]	poor[8]	9	poor[10,7]	poor[10]	poor[3]
5	good	fair[23,6]	poor[8]	9	fair[7]	fair[3]	fair[3,7]
8	poor[11,2]	poor[12,2]	poor[8]	9	fair[20,11]	poor[11]	fair[20,11]
9	fair[2]	poor[5,7]	poor[8]	9	poor[3,10]	fair[10]	fair[3,7]
10	fair[2]	fair[21]	fair[2]	poor[15]	fair[16,13]	9	9

Explanation of Restrictive Features

1. Water moves through the soil too slowly.
2. Water moves through the soil too fast.
3. Slope of the land is too great.
4. Soil consists of too much clay; is slippery and sticky when wet and dries very slowly.
5. Soil has inadequate strength to support the weight of structures or machinery.
6. Soil volume is decreased or compressed excessively under weight of structures.
7. Soil erodes easily.
8. Permanent groundwater table is deep during dry season.
9. Practice is not applicable or not needed.
10. Land slopes are short and irregular in shape.
11. Bedrock is too close to surface.
12. Area has inadequate thickness of suitable soil material.
13. Soil is wet for long periods of the year.
14. Soil is temporarily flooded by stream overflow or runoff.
15. Drainage outlets are difficult or expensive to install.
16. Water infiltrates the surface soil slowly.
17. Soil is too sandy; very soft and loose; draughty and low in fertility.
18. When cut steeply soil embankments are unstable.
19. Water infiltrates the soil surface rapidly.
20. Soil retains too little moisture for plant use during dry periods.
21. Water can form tunnels or pipelike cavities in the soil.
22. Difficult to reclaim those areas where soils have been removed.
23. Soil expands when wet; shrinks and cracks when dry.
24. Water table at or near surface during wet periods.

Geology

The planning area is in the felsic igneous complex. Igneous rocks are those which solidified from molten material. This complex is characterized by a light colored massive and granitic texture. The associated topography consists of rolling dissected hills with slight to moderate slopes. Rock in this complex is useful for construction, providing crushed stone (highway base aggregate) and concrete products. There are two crushed stone quarries in the Knightdale planning area, one active (Wake Stone) and one inactive (Superior Stone). Groundwater associated with this geologic type is the best of the three general types in Wake County. Diabase dikes cut across the grain of surrounding rock in portions of the planning area. Diabase is a very hard type of igneous rock which, because of it hardness, can cause construction problems.

Topography

Map 2 is a reproduction of USGS topographic maps for the Knightdale Planning Area with the drainage areas (to be discussed later in this report) superimposed. As can be seen from Map 2, topography in the Knightdale area is rather flat, with few slopes over 5%. The only soils too steep for construction purposes are along stream banks.

Surface Water and Stream Classifications

Also shown on Map 2 are the drainage basins of the creeks in the Knightdale Planning Area.

The creek names are those used in the 201 study. Topography determines the stream into which an area drains with the ridge lines becoming the drainage divides. Because sewer lines generally flow by gravity, this information is important in determining the feasibility of sewering various portions of the planning area and the number of pump stations which would have to be provided.

The Water Quality Section, Division of Environmental Management, North Carolina Department of Natural and Economic Resources classifies the streams in the state based on "existing or contemplated best usage of the various streams in the basin, as determined through studies and evaluations and the holding of public hearings for consideration of the classifications proposed". The classification scheme is as follows:

Fresh Waters

Class A-I - Suitable as a source of water supply for drinking, culinary, or food processing purposes after treatment by approved disinfection only, and any other usage requiring water of lower quality.

Class A-II - Suitable as a source of water supply for drinking, culinary, or food processing purposes after approved treatment equal to coagulation, sedimentation, filtration, and disinfection, etc., and any other usage requiring waters of lower quality.

Class B - Suitable for outdoor bathing, boating and wading, and any other usage requiring waters of lower quality.

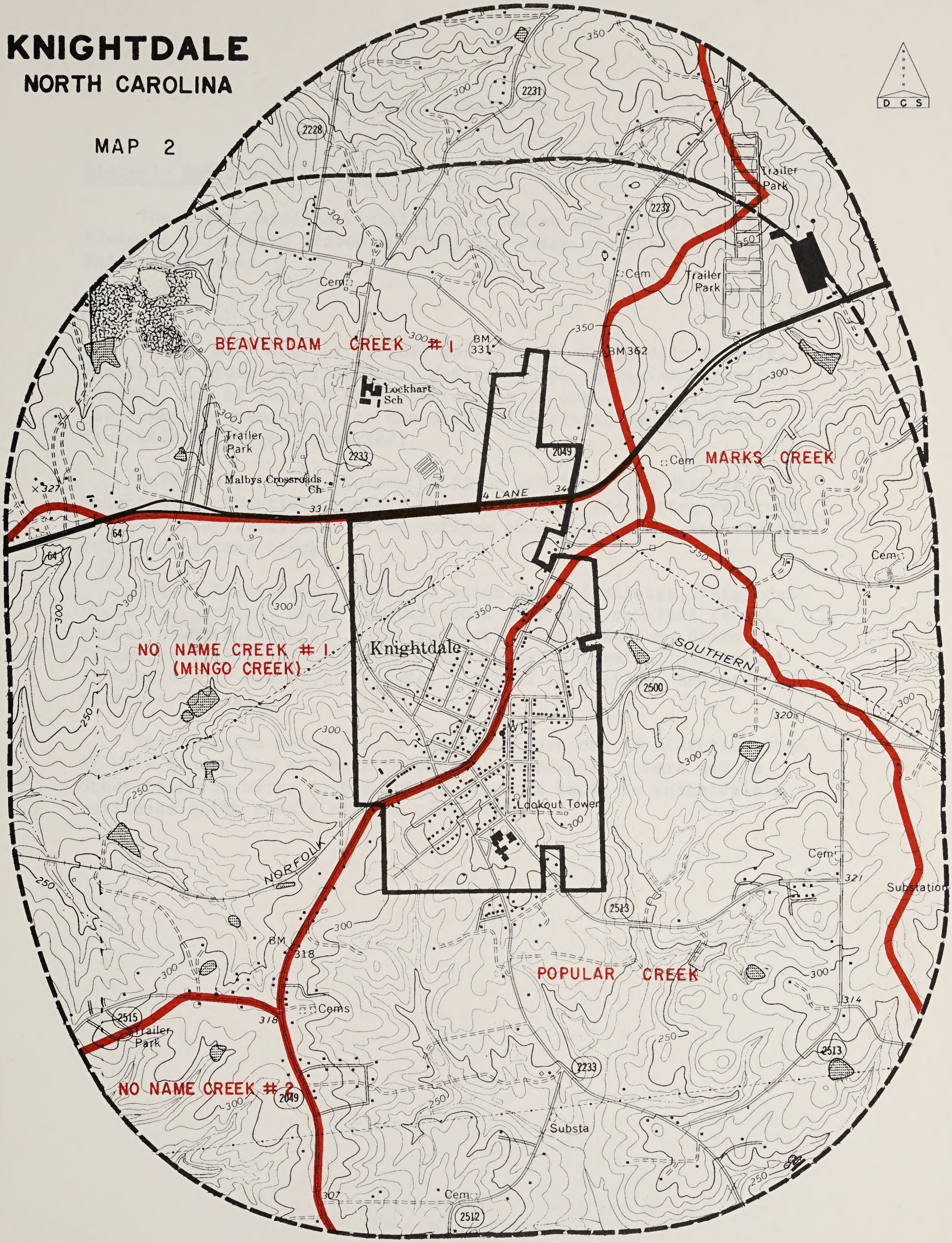
Class C - Suitable for fish and wildlife propagation. Also suitable for boating, wading, and other uses requiring waters of lower quality.

According to the 208 Inventory, all streams in the Knightdale area are Class C.

A Flood Insurance study has been made by the Army Corps of Engineers which covers the streams in Wake County. At an appropriate time, this study can become the basis for the flood plain zoning regulations required by the Federal Flood Insurance program.

KNIGHTDALE
NORTH CAROLINA

MAP 2



TOPOGRAPHY & DRAINAGE BASINS

BASIN BOUNDARIES

MANMADE CONDITIONS

Historic Buildings

The North Carolina Division of Archives and History has three historic structures listed in its files which are located in the Knightdale area.

These are:

Beaver Dam. Jct. of SR 2049 and SR 2233, Knightdale vicinity. Plantation house of traditional design; good, restrained Georgian finish. One of three Hinton plantations in area. Private. SL (approved for nomination to the National Register by the State Professional Review Committee).

Knightdale Depot. Corner of First and Robertson Streets, Knightdale. Twentieth century one-story board and batten railroad station, adaptively used as an antique shop. Private. Two freight buildings across track.

Midway Plantation. US 64, 8 miles east of Raleigh, Knightdale vicinity. Typical Greek Revival house with much original fabric, number of outbuildings. Built by Charles Lewis Hinton, State Treasurer (1839-1843; 1845-1852) and member of family influential in Wake County history. Private. (Listed in National Register of Historic Places).

The Division notes that a thorough inventory of historic sites in Wake County has not been completed. Therefore, there may be other historic sites in the Knightdale area known to Knightdale's residents which should also be preserved.

Population

Past Trends

The following figures show the growth of Knightdale during the decades between 1940 and 1970. A 1975 estimate is also included.

TOWN OF KNIGHTDALE

Year	Population
1940	352
1950	461
1960	622
1970	815
1975*	940

*Estimate by North Carolina Department of Administration.

Future Projections

Population projections for the Knightdale area have been made by several sources. The Wake County Planning Department made projections for the townships in Wake County. The projections for Saint Matthews Township were:

Year	Projection
1970	9,920
1980	12,327
1985	12,949
1990	13,561
1995	16,528

According to the housing count done in conjunction with this report, there were 473 occupied dwelling units in the extraterritorial area. At a rate of 3.35 persons per dwelling unit (household size in Saint Matthews Township according to the 1970 census), there would be 1585 persons in the extraterritorial area in 1976. Added to the 940 estimated for the town, there would be approximately 2525 people in the town plus the extraterritorial area[1]. Interpolating the township estimate above one would derive a projected population in the township of 11,364 for 1976. Therefore, the town and extraterritorial area would comprise roughly 22% of the township population. Assuming this relation continues in the years ahead, the town and extraterritorial area could be projected to have the following population in the years ahead:

Year	Population
1980	2711
1985	2849
1990	2983
1995	3636

The method used to obtain these projections is based on past trends-which may or may not hold true in the years ahead.

A second set of projections are those found in the 201 sewer study. Those projections have been made by drainage basins and sewer service areas. Knightdale's service area is defined as all of the Mingo Creek drainage basin population, and 80% of the population of the Poplar Creek and Mark's Creek Basins. The 1980 total is projected to be 2623, and the 1998 total 3245. However, these projections do not include the rapidly developing area in the Beaverdam Creek #1 basin.

A third projection method would be to assume that growth in the Knightdale area will accelerate somewhat over past trends. Because of the suitable natural conditions in the Knightdale area, the proximity of the town to Raleigh and the town's accessibility to US 64, this is not an unreasonable assumption, particularly since 109 new subdivision lots are on the drawing board and should be completed in the next three years in the Knightdale area.

[1]Actually the 940 is for 1975, but the discrepancy of one year in these figures should be slight.

If the town's sewage treatment problems can be solved, it does not seem unreasonable to assume growth of 100 persons per year. Such growth would produce the following projections for the years ahead:

Year	Projected Population Town and Extraterritorial Area
1976	2525
1980	2925
1985	3425
1990	3925
1995	4425
2000	4925

While these projections may be somewhat high, there is more than adequate suitable land to handle such growth. Therefore, this set of projections will be used in the needed acreage computations in a later section of this report to provide an additional safety margin above that used in the computations.

Economy

Major industries in the Knightdale area are Square D and Transmission Networks International, both of which are machinery parts manufacturers. There are also a number of stores and service uses.

Family income in the town and township is compared with that for Wake County and the State of North Carolina in table 2. As can be seen from table 2, Knightdale had a lower percent in the two lowest income brackets than the township, county, or state and a high concentration of its population in the $5,000-$9,999 bracket. Thus, it is less likely to be able to claim the extreme poverty of some areas, yet, both its small size, and the moderate income of a large portion of its residents are unlikely to give the town a high tax base with which to provide town services.

This situation works to the town's disadvantage by disqualifying it from grants which are based on poverty factors, even though the town may not be able to finance needed services on its own.

Measures to increase the income of the town's residents and add to the town's tax base would aid in alleviating this situation.

TABLE 2

CUMULATIVE PERCENT OF FAMILIES BY INCOME
KNIGHTDALE, SAINT MATTHEW'S TOWNSHIP, WAKE COUNTY, STATE OF NORTH CAROLINA
1970 CENSUS

Income Bracket	Knightdale	Saint Matthew's Township	Wake County	State of N.C.
Under $ 1,000	1.7	2.3	2.6	3.4
$ 1,000-$ 4,999	10.3	16.9	20.3	28.2
$ 5,000-$ 9,999	58.8	54.1	53.1	66.3
$10,000-$14,999	85.6	84.6	79.4	88.5
$15,000-$24,999	97.7	97.2	95.5	97.5
$25,000 and Over	99.9*	99.9*	100.0	100.0

*
Due to rounding.

Educational Attainment

Table 3 compares educational attainment in Knightdale with that in Saint Matthews Township, Wake County and the State.

TABLE 3

REVERSE CUMULATIVE PERCENT OF PERSONS 25 YEARS AND OVER BY YEARS OF SCHOOL COMPLETED, KNIGHTDALE, SAINT MATTHEWS TOWNSHIP, WAKE COUNTY, STATE OF NORTH CAROLINA, 1970 CENSUS.

Years of School Completed	Knightdale	Saint Matthews Township	Wake County	State of North Carolina
College				
4 or more years	12.4	9.3	17.1	8.4
1-3 years	25.6	23.0	30.8	16.8
High School				
4 years	45.8	51.1	53.6	38.5
1-3 years	77.6	74.4	74.7	62.9
Elementary School				
8 years	88.7	81.2	80.8	71.7
1-7 years	100.1*	97.9	98.2	98.0
0 years		100.0	99.9*	100.0

As can be seen from table 3, educational attainment by bracket, is, in general higher in Knightdale than in the State or Township and varies in relation to the county, but the relationship between town, township and county is not totally consistent by bracket .

*Due to rounding.

Existing Land Use

Map 3 shows existing land use in the Knightdale area, color-coded by category. The approximate acreage in various types of land use are shown in table 4.

TABLE 4

EXISTING LAND USE

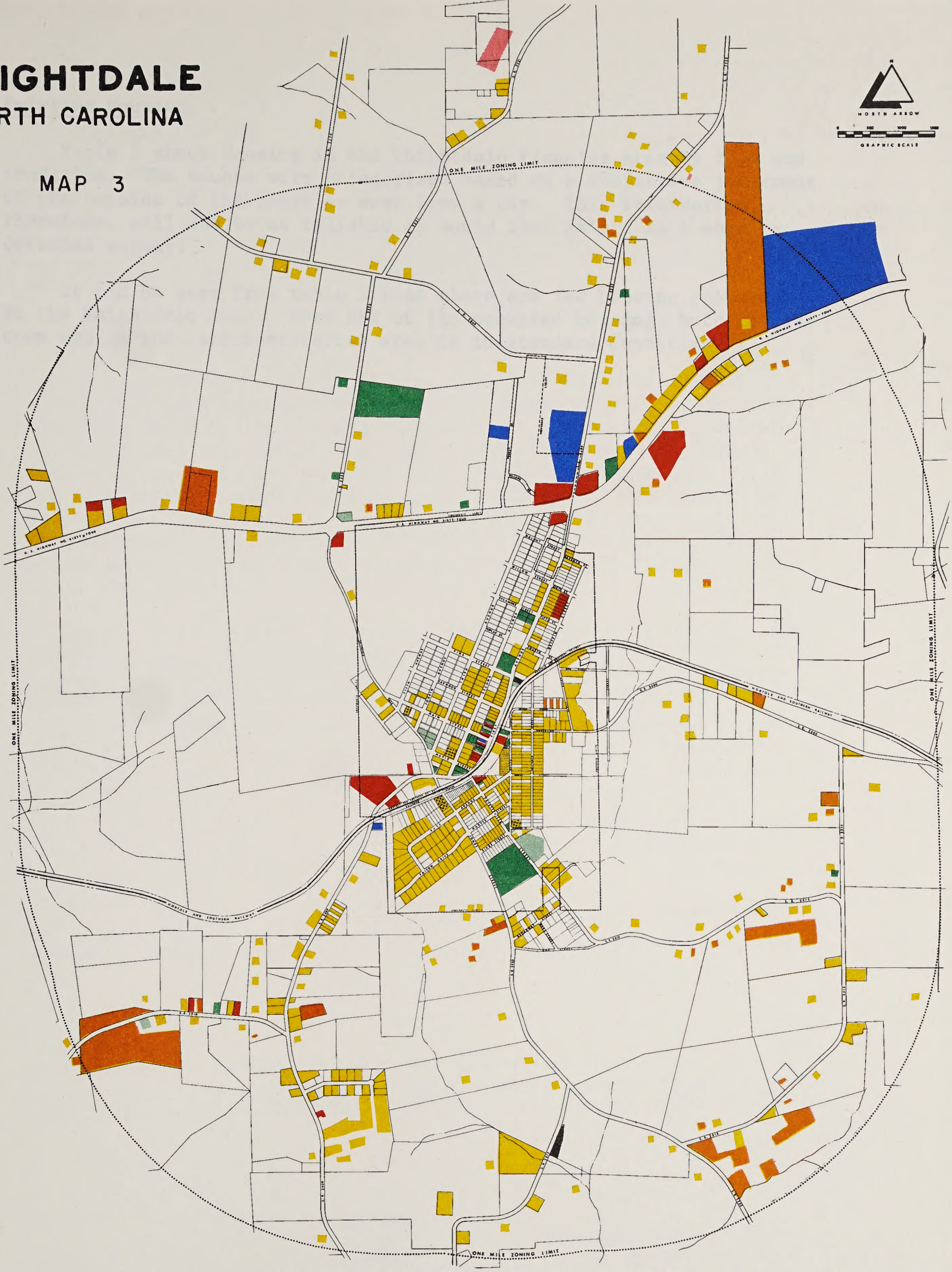
Land Use	Inside Town Acreage	Outside Town Acreage	Total Acreage
Residential			
Single Family	82	110	192
Multi-Family	2	1	3
Mobile Homes	1	118	119
Manufacturing	4	35	39
Trade	10	17	27
Transportation, Communication and Utilities	.2	1	1
Cultural Entertainment and Recreation Services	6	1	7
Resource Extraction	-	14	14
Road Right-of-Way	72	70	142
Railroad Right-of-Way	10	27	37
Vacant	326	3928	4240
Total	526	4325	4851

As can be seen from table 4, residential land use of various types is the most prevalent use of land, both inside the town, and in the extraterritorial area. The various types of land use seem to be fairly well separated-there are few apparent conflicts.

Past development has occurred predominantly along a northeast-southwest axis, which follows a ridge line, with its nucleus along the railroad track. Development, particularly commercial, is also occurring along US Highway 64.

KNIGHTDALE
NORTH CAROLINA

MAP 3



EXISTING LAND USE

RESIDENTIAL
- SINGLE FAMILY
- MULTI-FAMILY
- MOBILE HOMES & PARKS

- MANUFACTURING
- TRANSPORTATION, COMMUNICATION, & UTILITIES
- TRADE-PRIMARY & SECONDARY
- SERVICES-FINANCIAL, ADVISORY, & GOVERNMENT
- CULTURAL, ENTERTAINMENT, & RECREATION

Existing Housing

Table 5 shows housing in the Knightdale Planning area by type and condition. The houses were categorized based on a subjective judgement of the outside of the house as seen from a car. This information, therefore, will not be as reliable as would that gained in a more detailed survey.

It can be seen from table 5 that there are few housing problems in the Knightdale area. Over 98% of the occupied housing, both in the town and in the extraterritorial area is in standard condition.

TABLE 5

EXISTING HOUSING

Housing Type	IN-TOWN Standard	Deteriorating	Dilapidated
Single Family			
Occupied	231	4	1
Vacant	3	-	1
Units in Buildings with 2 or more Units			
Occupied	32	2	-
Mobile Homes	4	-	-

Housing Type	IN EXTRATERRITORIAL AREA Standard	Deteriorating	Dilapidated
Single Family			
Occupied	163	13	3
Vacant	1	2	1
Units in Buildings with 2 or more Units			
Occupied	2	-	-
Mobile Homes	292	-	-

Housing Type	TOTAL Standard	Deteriorating	Dilapidated
Single Family			
Occupied	394	17	4
Vacant	4	2	1
Units in Buildings with 2 or more Units			
Occupied	34	2	-
Mobile Homes	296	-	-

Community Facilities

The Town of Knightdale is protected by 38 volunteer firemen, and 2 full-time and 4 part-time police officers. The fire department is currently in the process of upgrading its standards in order to receive a rating of 8, the best which a volunteer fire department can hold.

Map 4 shows existing water lines in Knightdale[1], while Map 5 shows existing sewer lines[2].

Several years ago, Wake County adopted an agreement with the county's various towns which established perimeter areas over which the towns would be responsible for water and sewer. The boundaries of these areas were determined primarily by the individual towns involved--thus they are not consistent throughout the county and are based more on administrative than physical considerations. They are likely to be undergoing revision in the near future, based on the 201 study and the county's comprehensive planning efforts. Members of the county planning board and staff are currently discussing this issue with representatives of the towns.

Map 6 shows the boundary of Knightdale's current perimeter area, and the area which could be served by gravity according to the 201 study.

State maintained, paved and unpaved roads are shown on Map 7[3].

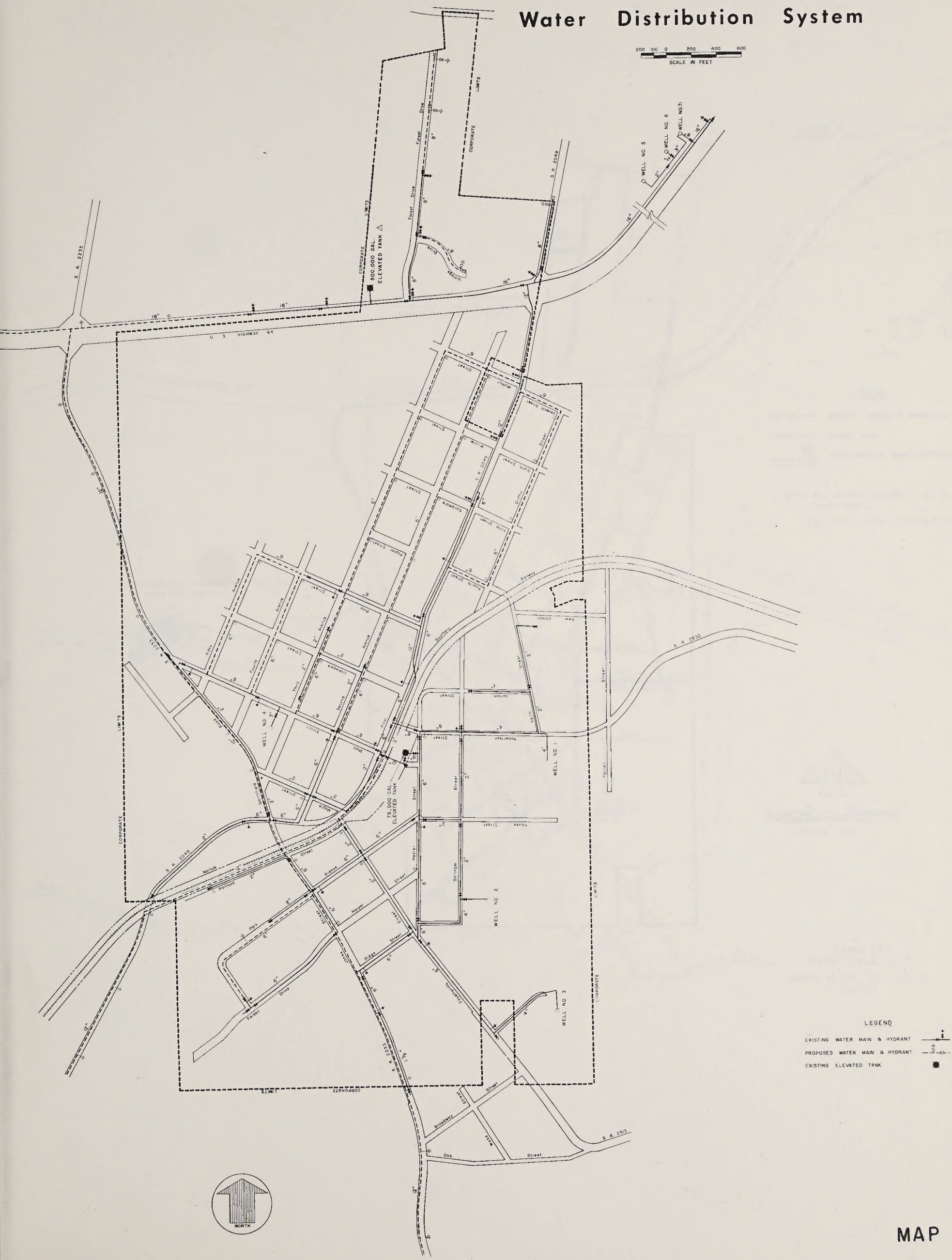
[1]Source: Tate Lanning and Associates

[2]Source: Pierson and Whitman, Inc.

[3]Source: Tate Lanning and Associates

TOWN OF KNIGHTDALE, N. C.

Water Distribution System



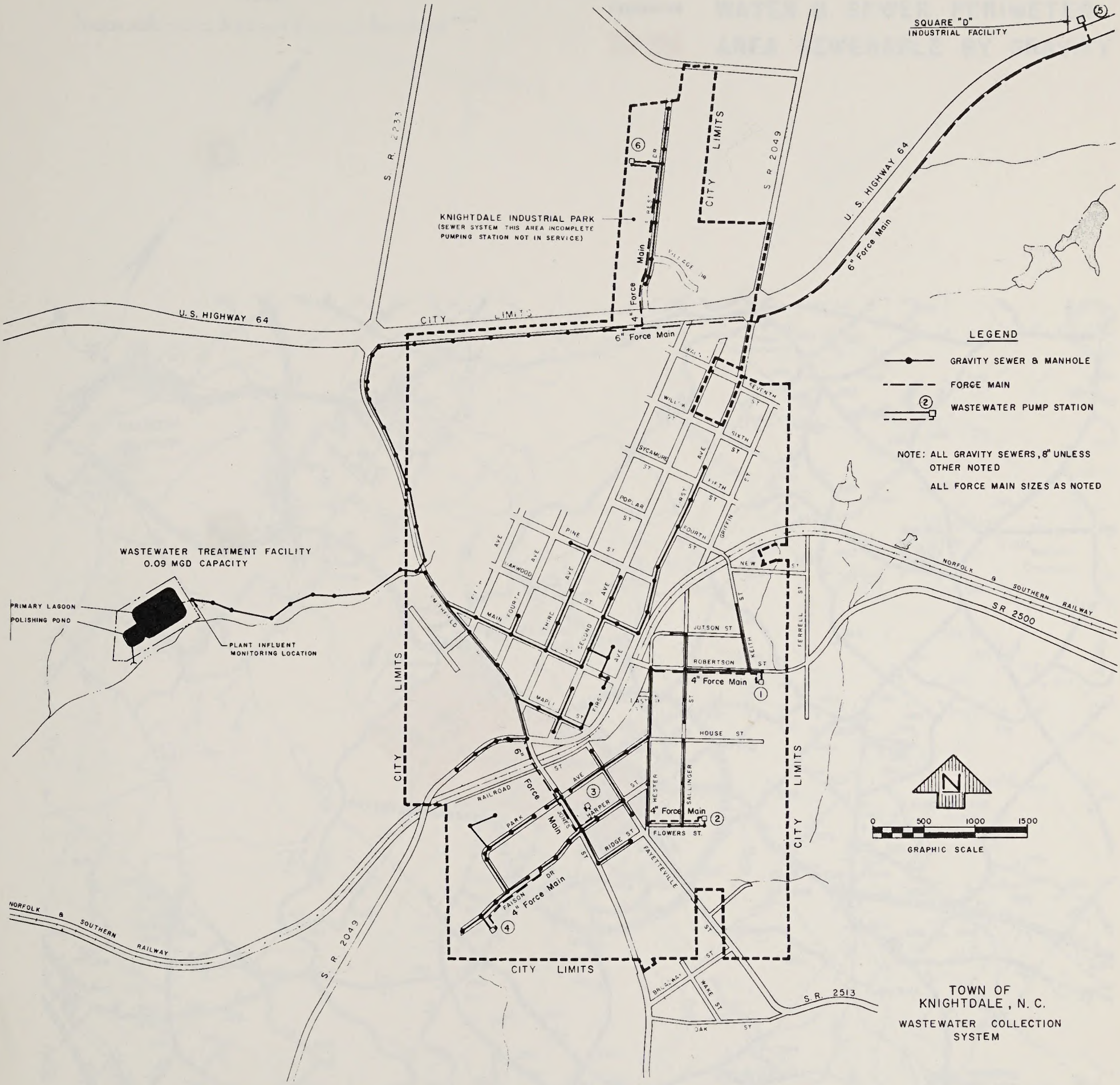
LEGEND

EXISTING WATER MAIN & HYDRANT

PROPOSED WATER MAIN & HYDRANT

EXISTING ELEVATED TANK

MAP 4



TOWN OF
KNIGHTDALE, N. C.

WASTEWATER COLLECTION
SYSTEM

MAP 5

WAKE COUNTY

NORTH CAROLINA

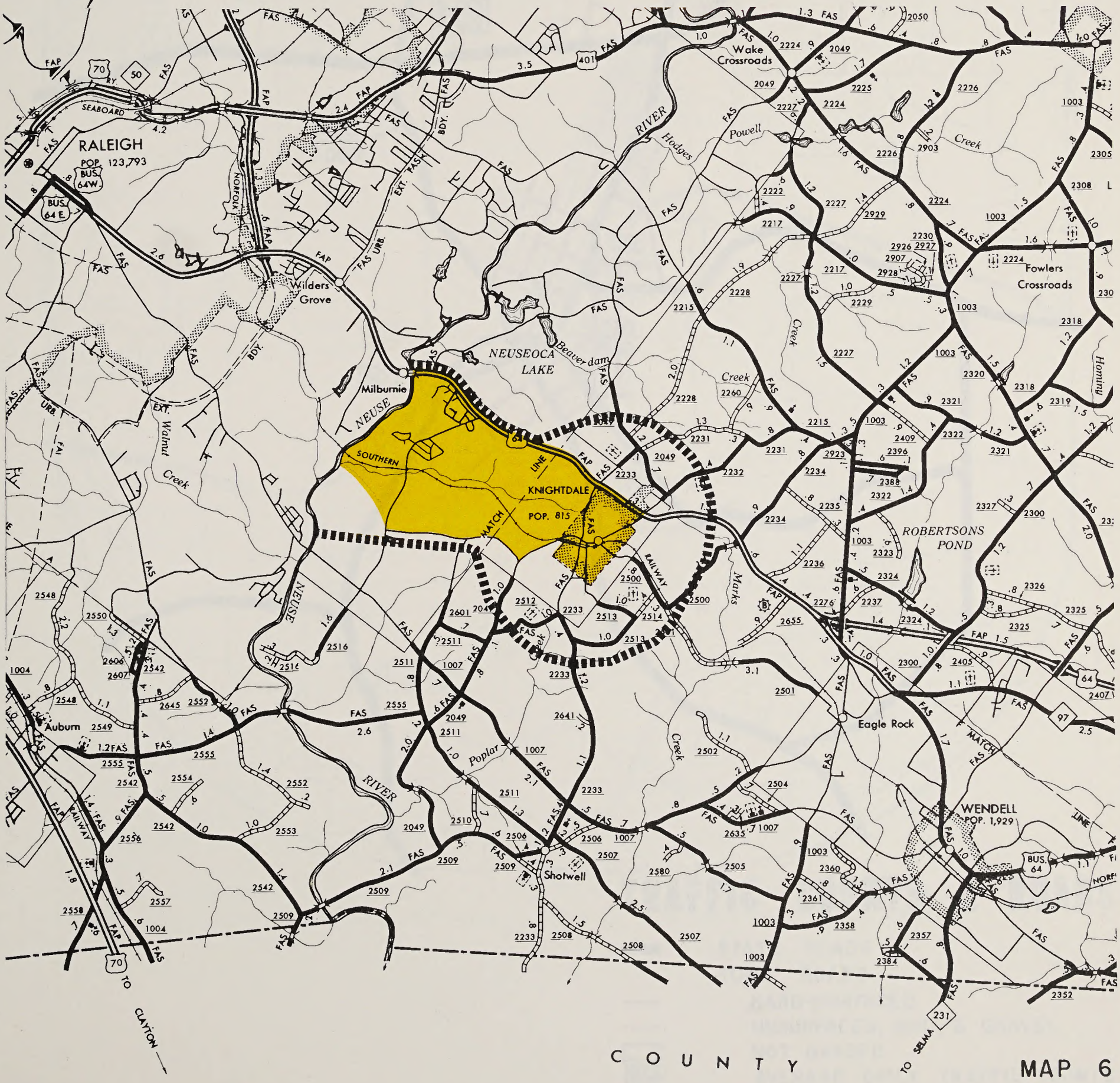
SCALE.

1 0 1 2 3 4 MILES

WATER & SEWER JURISDICTION IN RELATION TO THE COUNTY

WATER & SEWER PERIMETER

AREA SEWERABLE BY GRAVITY



MAP 6

KNIGHTDALE
NORTH CAROLINA

MAP 7

TRAFFIC COUNTS & ROADS

STATE ROADS

TOWN ROADS

HARD-SURFACED

UNSURFACED, SOIL, & GRAVEL

NOT GRADED

1972
1975
AVERAGE DAILY TRAFFIC COUNTS

GOALS, OBJECTIVES, STANDARDS, PLAN, POLICIES, EVALUATION CRITERIA

Goals and Objectives

After information on existing conditions has been gathered, the next step in planning is for the people in the town to decide what their goals for the community are. After such goals have been established, objectives, or steps toward obtaining these goals can be formulated.

The Knightdale Planning Board was given a handout with a brief summary of existing conditions in the Knightdale area and the following questions to consider:

1. What types of development are most desired in the Knightdale area? Least desired?

2. What are the most critical issues facing the Knightdale area? What actions should be taken concerning them?

3. Where are the areas most suitable for development? What areas are most likely to develop in the next 5, 10, 20 years?

A planning board work session was held on June 13. The projections in this report concerning the amount of land needed for various kinds of development and some suggested locations for the different development types were presented, and these suggestions and the questions in the handout were discussed at the work session.

The current limitation on sewerage tap-ons was perceived as a critical issue as was planning in a comprehensive manner for the town and extraterritorial area. Other issues discussed were: providing proper access for establishments locating along US 64; the necessity for more input from the town, based on its land use plan, in the location of power lines; the encouragement of new industrial development of a clean, attractive character, and new commercial development with variety as to type and location (a stronger downtown, neighborhood shopping facilities and highway oriented commercial development). All of these types of industrial and commercial development were seen as being desirable for the area. It was pointed out that the Knightdale community extends far beyond the boundaries of the extraterritorial area and that many of the residents of subdivisions between Raleigh and Knightdale could utilize Knightdale for their immediate shopping needs if adequate facilities were provided. The planning board, therefore, sees potential for Knightdale to become less a bedroom community for Raleigh and more of a distinctive entity in the years to come.

From this discussion, it is not difficult to derive some broad goals toward which the planning board would like to see the Knightdale area move.

SUGGESTED BROAD GOALS FOR THE KNIGHTDALE COMMUNITY

1) To the extent possible, Knightdale should become an area characterized by variety and diversity of types of development, rather than residential development alone. However, development of an extremely heavy commercial or industrial character would be incompatible with the present predominantly residential character of the community and will not be encouraged.

2) New development, to the extent possible, will be encouraged contiguous with the current town boundaries and in areas where water, sewer, and other town services can be most economically provided.

3) Knightdale will attempt to strengthen its role as an industrial and trade center for an area of rural and suburban development outside of the immediate areas of Raleigh, Wendell, Rolesville and Clayton.

4) Portions of the area along US 64 will be encouraged to develop commercially to take advantage of the heavy traffic flow along this thoroughfare, if means can be found of providing safe, suitable access to these businesses without creating traffic problems on US 64. Detailed planning for this area is an issue of high priority for the town.

5) Development will be encouraged to take place in locations, at intensities, and in a manner which will be compatible with the natural environment.

6) Once comprehensive plans for the area's development have been formulated and adopted, they will be utilized as a framework for individual small-scale land use decisions, and as an aid in making decisions of regional scale.

ANNUAL OBJECTIVES

In order to bring the area closer to the broad goals set forth above, the town can take the following steps toward achieving these goals, on an annual basis.

1977	Initiate steps with the North Carolina Department of Transportation to have a mutually adopted thoroughfare plan prepared for the town. Have a detailed plan for service roads along US 64 prepared.
1977 and subsequent years	Work toward implementation of the 201 Facilities Plan in order to resolve the sewerage tap-on problem.
1977	Allow Wake County to enforce Sedimentation and Erosion Control for the town.
1977-78	Revise the zoning ordinance and map to reflect the new policies adopted by the town.
1978	Initiate floodplain zoning when the appropriate studies have been completed by the Corp of Engineers.
On an annual basis	Review and update the plan, policies and programs in this report based on changing conditions.

Acreage and Location Standards

As well as determining goals and objectives, it is also necessary to make projections of the amount of land likely to be needed for future development and to have standards for the best location for various types of uses.

Projections concerning the amount of land which will be needed are at best rough "ballpark" figures, since no one can predict the future with any accuracy. Location standards can be more objective and concrete. Tables 6 through 9 on the following pages are adapted from the method used in the Piedmont Triad Council of Governments' Regional Land Use Planning Manual as Adapted from the LRO's Land Use Planning Manual and reproduced in North Carolina Local Government Planning Manual #1 (HUD Land Use Element Certification) draft, prepared by the Local Planning and Management Services Section of the Department of Natural and Economic Resources. This method was used because it provides a tie-in with both the HUD land use element certification and the proposed State Land Classification System.[1] These tables utilize the planning area population projections in the population section of this report, and the figures in the sections on existing land use and housing.

Table 10 presents location standards for various types of land uses.

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[1]The likelihood of such a system being adopted during this session of the General Assembly has become increasingly doubtful - however information concerning proposed classifications is included for informational purposes only.

TABLE 6

RESIDENTIAL LAND REQUIREMENTS
KNIGHTDALE PLANNING AREA-1985 , 1995

		1985	1995
1)	Population in dwelling units in target year	3425	4425
2)	Population in dwelling units 1976	2525	2525
3)	Increase 1976-target year	900	1900
4)	Replacement dwelling units 1976-target year		
5)	Vacancy + Choice Other related Uses = (F) .05 1.5 .05 Factor	1.6	1.6
6)	Persons per dwelling unit-target year	3	2.8
7)	Total dwelling units-target year	1142	1580
8)	Total dwelling units-1976	747	747
9)	Dwelling unit gain 1976-target year	395	833
10)	Replacement dwelling units	4	23
11)	Total new dwelling units, 1976-target year	399	856
12)	Dwelling units per acre for new dwelling units	3	3
13)	New acreage needed for new dwelling units, 1976-target year	133	285
14)	(F) Factor	1.6	1.6
15)	Total new residential acres allocated to planning area , 1976-target year	213	456
16)	% of new residential acres in transition zone	90%	90%
17)	New residential acres allocated to transition zone	192	410

TABLE 7

COMMERCIAL LAND REQUIREMENTS

		1985	1995
1)	Acreage in trade and services-1976	57	57
2)	Estimated population-1976	2525	2525
3)	Acres/100 persons-1976	2.3	2.3
4)	Acres/100 persons- target year	2.5	2.6
5)	Projected population-target year	3425	4425
6)	Projected commercial acreage needed-target year	86	115
7)	Projected additional commercial acreage needed	29	58
8)	Choice Factor	1.5	1.5
9)	Total additional commercial acreage needed	44	87
10)	% of new commercial acreage allocated to transition zone	100%	100%
11)	Acreage allocated to transition zone	44	87

TABLE 8

INDUSTRIAL LAND REQUIREMENTS

		1985	1995
1)	Acreage in manufacturing, transportation, communication and utilities, and resource production and extraction-1976	54	54
2)	Estimated population-1976	2525	2525
3)	Acres/100 population-1976	2.1	2.1
4)	Acres/100 population-target year	2.5	2.6
5)	Projected population-target year	3425	4425
6)	Projected industrial acreage needed-target year	86	115
7)	Projected additional industrial acreage needed 1976-target year	32	61
8)	Choice Factor	2	2
9)	Total additional industrial acreage needed	64	112
10)	% of new industrial acreage allocated to transition zone	100%	100%
11)	Acreage allocated to transition zone	64	112

TABLE 9

TRANSPORTATION LAND REQUIREMENTS

		1985	1995
1)	New acreage needed for total new dwelling units-1976-target year (excluding (F))	133	285
2)	New additional acreage needed for vacancy rate and other related uses 1976-target year	13	29
3)	Total new residential acres allocated to planning area, 1976-target year	146	314
4)	% of total new residential acres allocated to transition zone	90%	90%
5)	New residential acres used to calculate transportation acreage for transition zone	131	283
6)	New commercial acres needed 1976-target year (excluding choice factor)	29	58
7)	% of new commercial acres allocated to transition zone	100%	100%
8)	New commercial acres used to calculate transportation acreage for transition zone	29	58
9)	New industrial acres needed in planning area, 1976-target year (excluding choice factor)	32	61
10)	% of new industrial acres allocated to transition zone	100%	100%
11)	New industrial acres used to calculate transportation acreage for transition zone	32	61

Uses	1985	1995
Residential	131	283
Commercial	29	58
Industrial	32	61
Total	192	402
X33.33% = Transportation Land Requirement	64	134

Explanation of Tables 6 through 9.

Table 6 - Residential Land Requirements

1)
and
2) These figures are explained in the population section of this report.

3) (1) minus (2)

4) For 1985, the number of occupied dilapidated units in 1976 was used. For 1995, the number of deteriorating and dilapidated units was used.

5) A factor must be added to allow for some dwelling units to be vacant as part of the moving process, for some choice of land, since all land is not available for development at any one time, and for uses related to residential uses such as recreation facilities.

6) Decreased somewhat from present, since nationwide trends have been toward decreasing household size.

7) (1) divided by (6).

8) From housing count.

9) (7) minus (8).

10) Same as (4).

11) (9) plus (10).

12) In 1976, this was 2.3 for planning area according to land use survey. It is assumed new development will be more urban in character.

13) (11) divided by (12).

14) Same as (5).

15) (13) times (14).

16) Some rural development will continue to occur.

17) (15) times (16).

Table 7 - Commercial Land Requirements

1) Based on land use survey.

2) Same as in table 6.

3) 57 divided by 25.25

4) Increased slightly to account for growth of Raleigh toward Knightdale area.

5) Same as in table 6.

6) 34.25 times 86; 44.25 times 115.

7) (6) minus (1).

8) Needed since all suitable commercial land will not be available.

9) (7) times (8).

10) Commercial development should be provided with public services.

11) (9) times (10).

Table 8 - Industrial Land Requirements

1) Based on land use survey.

2) Same as in table 6.

3) 54 divided by 25.25

4) Increased slightly to take care of more extensive plants which many industries require.

5) Same as in Table 6.

6) 34.25 times 86; 44.25 times 115.

7) (6) minus (1)

8) Provided for same reason as for other land uses, but larger in case of industrial to provide an additional safety margin.

9) (7) times (8)

10) Industrial development should be provided with public services.

11) (9) times (10)

Table 9 - Transportation Land Requirements

The procedure used is to take acreage needed for each type of land use excluding the choice factor, add these together and multiply by 33.33% to derive an estimate of transportation acreage needed.

TABLE 10

LOCATION STANDARDS

Development Type and Intensity	Standard
Low density residential development - less than 1 dwelling unit per acre	Soils suitable for septic tanks. Slope of 10% or less Not in areas subject to flooding.
Medium density residential development - 1 to 4 dwelling units per acre	Public water, sewer, police, fire and other public services available Slopes of 10% or less. Not in areas subject to flooding. Near areas where neighborhood shopping facilities, schools, churches, and recreation facilities can be provided. On soils suitable for dwellings. Away from land uses likely to disturb residents.
High density residential development - apartments, townhouses, mobile home parks	In areas where all public services are available. Slopes of 10% or less. Access to arterial streets. Not in areas subject to flooding. Near areas where neighborhood shopping facilities, churches, schools, recreation areas and open space can be provided. Away from areas where traffic will disturb other land uses. Away from land uses likely to disturb residents of apartments, townhouses and mobile home parks. On soils suitable for such uses.
Neighborhood and town-oriented office and shopping facilities	Public services available. Slopes of 5% or less. Near intersections of arterials where traffic will not filter through residential areas. Not in areas subject to flooding. On soils suitable for small commercial buildings. Where adequate buffers from residential uses can be provided.

Table 10 contd.

Development Type and Intensity	Standard
Highway-Oriented Commercial Development	Away from residential uses or adequate buffer provided. Where possible, in clusters or with a service road provided. Access from cluster or service road to a major arterial needed. Slopes of 5% or less. Public services available. Not in areas subject to flooding.
Industrial Development	On soils which will support industrial buildings. Slopes of 5% or less. Public services available. Access to major thoroughfares and railroads. Not in areas subject to flooding. Compatible with surrounding land uses or adequate buffer provided.

LOCATION POLICIES

1. After the two subdivisions currently proposed are completed, additional new residential development should be encouraged first in the undeveloped area inside the town limits, toward the west of the town, and then in the immediately adjoining area outside the town limits. Soils in much of this area are suitable for residential development, and this area is sewerable by gravity, according to the 201 plan. Development inside and near the town limits will lead to a more compact development pattern which is in general, more economical to provide with town services. The area is also adjacent to much of the town's current residential development.

   Programs to implement this policy would be to zone this area R-12 or R-15, with selected portions for higher density residential development, and for the town to cooperate with would be developers who desire to locate residential development in this area.

2. Additional commercial development adjacent to the present downtown should be encouraged, as should highway oriented development on those portions of U. S. 64 shown on the land use plan map. The town should also look favorably toward the provision of small neighborhood commercial facilities near residential areas.

   Programs to implement this policy would be: (1) to zone additional land for retail commercial adjacent to the present central business district. (2) The highway commercial zoning along U. S. 64 allows retail uses if enclosed within a building with a special exception permit. This type of zoning permits imposition of the controls needed to make this type of development compatible with its surroundings and the traffic-serving character of the highway. Therefore this type of zoning should be retained. A detailed design study of service roads along U. S. 64 involving the Department of Transportation and the town's consulting engineer should be undertaken as soon as possible. (3) Neighborhood business zoning for tracts of land adjoining subdivisions which have access to arterial and/or collector streets would permit neighborhood convenience shopping facilities.

3. The area east of the town limits, south of U. S. 64 would be a suitable location for additional industrial development, if water and sewer could be provided for this area. Sites located in this portion of the planning area could have access both to U. S. 64 and the railroad. Soils in this area are in suitability group 1 a.

A program to implement this policy would be to zone the area indicated as industrial on the land use plan map for this type of development, either now, or at such time as an industry desires to locate in the Knightdale area.

GENERAL POLICIES

1. All future land use planning should continue to be coordinated with any community development strategies, capital improvement programs, transportation, open space, public utilities, and state and areawide land use plans affecting the area.

   Programs to implement this policy would be: review and final action by mayor and town board on all land use plans, policies, programs and ordinances; informational review of local and areawide plans and programs by planning board with attention to how these will affect present and future land use plans and controls; continuation of A-95 review procedure; continuation of referral to Region J Council of Governments and appropriate state agencies for information and comment, any local land use and community facility policies not covered by A-95; coordination with Wake County on planning matters affecting both jurisdictions.

2. The availability of those community facilities necessary to support the types and densities of development proposed should be an important consideration in the location and timing of development encouraged by the town.

   Programs to implement this policy are the reviews mentioned in general policy 1, as well as a willingness on the part of the town not to make zoning decisions which are inconsistent with community facility decisions.

3. Land use controls as mentioned in the annual objectives section should be developed and imposed.

Land Use Plan

The policies in the previous section are summarized in the land use plan shown on Map 8. This map indicates the location, intensity and timing for various types of development.

Allocation of New Population to Drainage Basins

If new development occurs as shown in Map 8, most new development will take place in the Beaverdam Creek #1 and No Name Creek #1 (Mingo Creek) drainage basins.

The following chart allocates population increase between these basins for the years 1985 and 1995.

Portion of Drainage Area Within Knightdale Planning Area	Population Increase 1977-1985	1986-1995
Beaverdam Creek #1	500	100
Mingo Creek	400	900

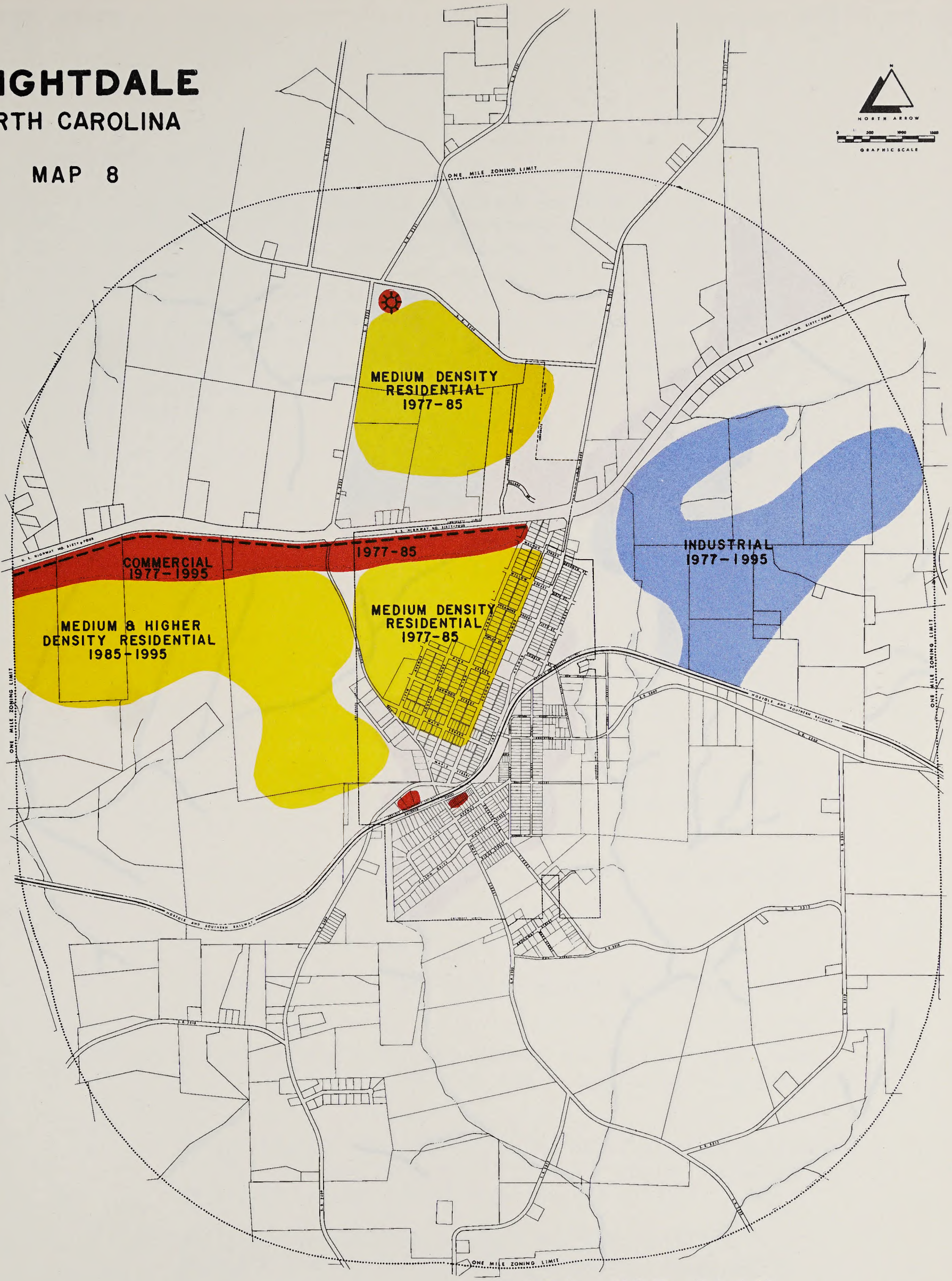
State Land Classifications

The proposed State Land Classification System, which was developed at the instruction of the 1974 State Legislature, establishes five classes into which a town may place the land in its jurisdiction. The system works on a ten year time frame, in contrast to the land use plan which is based on a longer time frame.

Map 9 shows the land in the Knightdale Planning Area classified according to this system. The portion of the area which is developed and has urban services has been placed in the developed category. The developed areas which do not have all urban services, but are projected to have them by 1985 have been placed in the transition class, as have new areas which are expected to develop and have urban services by this time. Areas which should be protected from development have been placed in the conservation class, and areas which will not receive urban services by 1985 are shown as rural. No examples of land which could be placed in the community class are found in the Knightdale area, as this class consists of rural communities containing a mixture of land uses, which will not receive urban services by 1985.

KNIGHTDALE
NORTH CAROLINA

MAP 8

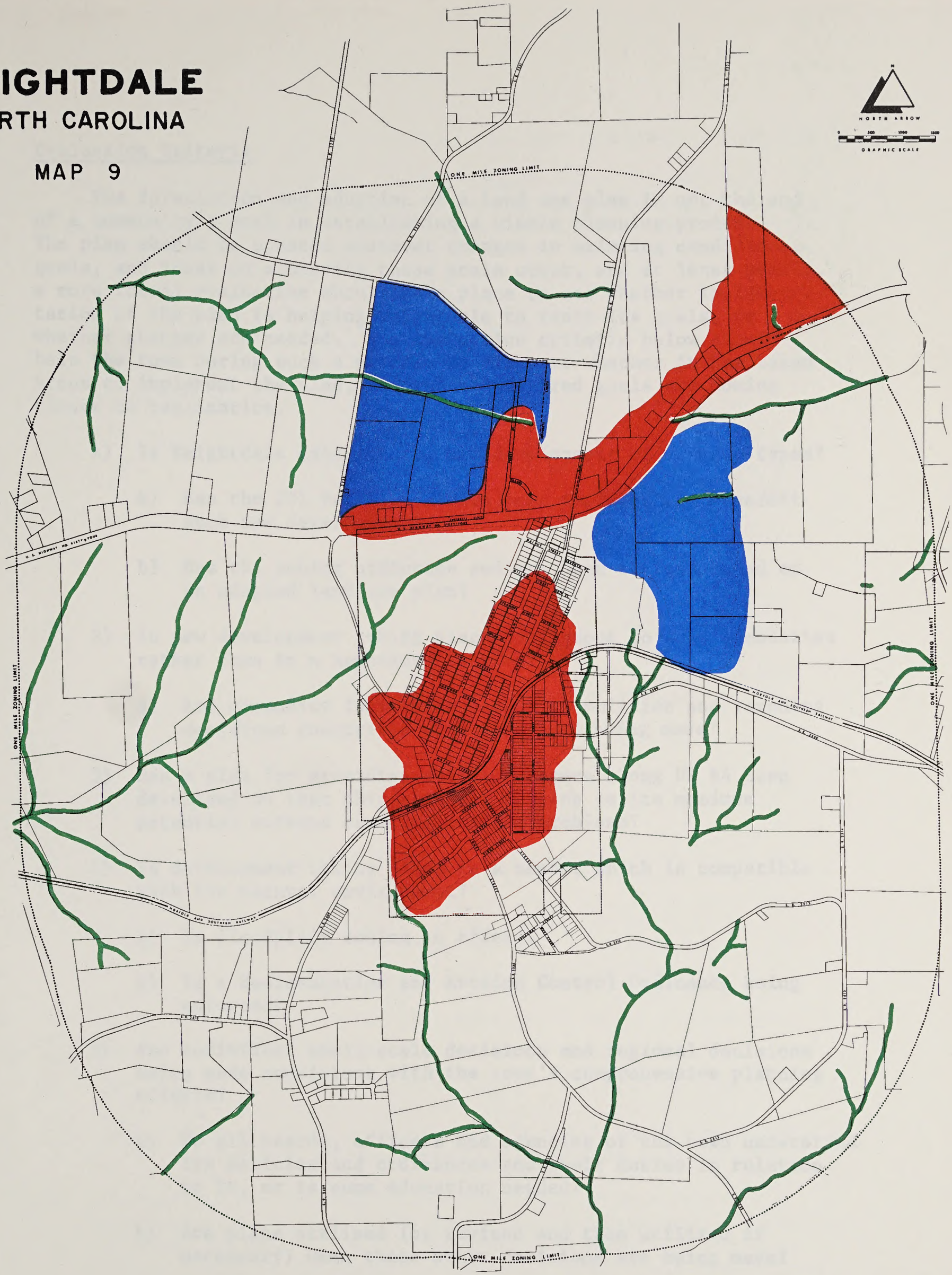


LAND USE PLAN

- RESIDENTIAL
- COMMERCIAL
  - HIGHWAY & DOWNTOWN
  - NEIGHBORHOOD CONVENIENCE
- INDUSTRIAL
- PROPOSED SERVICE ROAD - LOCATION DETERMINED IN CONJUNCTION WITH D.O.T.

KNIGHTDALE
NORTH CAROLINA

MAP 9



STATE LAND CLASSIFICATIONS

- DEVELOPED
- TRANSITION
- CONSERVATION
- RURAL

Evaluation Criteria

The formulation and adoption of a land use plan is not the end of a community's work in establishing a viable planning process. The plan should be updated whenever changes in existing conditions, goals, and ideas on achieving those goals occur, and at least yearly, a more formal evaluation should take place to see whether implementation of the plan is helping Knightdale to reach its goals, or whether changes are needed. The evaluation criteria below should help the town during such a process to discover whether it has taken steps to implement the plan, and whether desired goals are coming closer to realization.

1) Is Knightdale experiencing new development of various types?

   a) Has the 201 Facilities Plan been implemented to permit such new development?

   b) Has the zoning ordinance and map been revised based on an adopted land use plan?

2) Is new development taking place contiguous to town boundaries rather than in a haphazard fashion?

   a) Are community facilities extension policies and rezoning decisions compatible with this goal being made?

3) Has a plan for providing suitable access along US 64 been developed so that this area may develop to its maximum potential without creating traffic problems?

4) Is development taking place in a manner which is compatible with the natural environment?

   a) Is floodplain zoning in effect?

   b) Is a Sedimentation and Erosion Control Ordinance being enforced?

5) Are individual small-scale decisions and regional decisions being made consistent with the town's comprehensive planning efforts?

   a) Do all boards, officers and agencies of the town understand its policies and ordinances and their duties in relation to it, or is some education needed?

   b) Are plans utilized (or revised and then utilized if necessary) when these other decisions are being made?

Evaluation Procedure

The Planning Board should initiate the review and evaluation mentioned previously and recommend needed changes to the Board of Aldermen. The Board of Aldermen and Board of Adjustment should also request Planning Board review of plans, policies, programs or ordinances if they see a need for possible changes.

ENVIRONMENTAL ASSESSMENT

(1) Summary of the Proposed Plan: The plan discusses the most suitable uses of land in the Knightdale area, the location for various types and intensities of land use and the most appropriate timing for development. Broad goals, annual ojectives, policies, programs and evaluation criteria are set forth, as well as means for coordinating the policies and programs in this report with other policies and programs.

(2) Environmental Impact:

Beneficial: More orderly use of land will be encouraged. Development will be encouraged to take place in such a manner that environmental problems and hazards are minimized.

Adverse: Any development will bring with it some adverse environmental effects, such as an increase in runoff, and areas previously in natural state converted to urban character with resultant loss of wildlife habitat. However, there should be fewer environmental problems with the plan than without the plan.

(3) Adverse Environmental Effects Which Cannot be Avoided Should the Proposed Plan be Implemented: If development occurs, the adverse effects noted in (2) above will occur. However, these will be mitigated by the programs proposed in the plan.

(4) Alternatives: The alternatives to the proposed plan would be: (1) not to have a land development plan, an alternative which would have negative environmental effects; or (2) to encourage development of other types or in locations, at intensities or in a sequence other than that proposed. However, natural and manmade environmental conditions were considered in formulating the present plan. Therefore, it is unlikely that an alternate plan would be more beneficial to the environment than the proposed plan.

(5) Long-Term vs. Short-Term Productivity: This plan is long-term rather than short-term in nature. Implementation of this plan would encourage orderly growth patterns which would contribute to the maintenance and enhancement of long-term productivity.

(6) Irreversible and Irretrievable Commitments of Resources: Development would lead to the irretrievable commitment of building materials and land. Time of government officials and citizens will be needed to implement the proposed plan. This expenditure of resources will aid in the protection of the environment.

(7) Applicable Federal, State or Local Controls:

201 Facility Plan
208 Water Quality Study
Wake County Health Department Regulations
National Flood Insurance Program
NEPA
SEPA
North Carolina Sedimentation Control Act
Zoning Ordinance
Subdivision Regulations

(8) Deviation from HUD Standards: No such deviations are proposed.